Engineering Properties

This table gives the engineering classifications and the range of engineering properties for the layers of each soil in the survey area.

Hydrologic soil group is a group of soils having similar runoff potential under similar storm and cover conditions. The criteria for determining Hydrologic soil group is found in the National Engineering Handbook, Chapter 7 issued May 2007(http://directives.sc.egov.usda.gov/OpenNonWebContent.aspx?content=17757.wba). Listing HSGs by soil map unit component and not by soil series is a new concept for the engineers. Past engineering references contained lists of HSGs by soil series. Soil series are continually being defined and redefined, and the list of soil series names changes so frequently as to make the task of maintaining a single national list virtually impossible. Therefore, the criteria is now used to calculate the HSG using the component soil properties and no such national series lists will be maintained. All such references are obsolete and their use should be discontinued. Soil properties that influence runoff potential are those that influence the minimum rate of infiltration for a bare soil after prolonged wetting and when not frozen. These properties are depth to a seasonal high water table, saturated hydraulic conductivity after prolonged wetting, and depth to a layer with a very slow water transmission rate. Changes in soil properties caused by land management or climate changes also cause the hydrologic soil group to change. The influence of ground cover is treated independently. There are four hydrologic soil groups, A, B, C, and D, and three dual groups, A/D, B/D, and C/D. In the dual groups, the first letter is for drained areas and the second letter is for undrained areas.

The four hydrologic soil groups are described in the following paragraphs:

Group A. Soils having a high infiltration rate (low runoff potential) when thoroughly wet. These consist mainly of deep, well drained to excessively drained sands or gravelly sands. These soils have a high rate of water transmission.

Group B. Soils having a moderate infiltration rate when thoroughly wet. These consist chiefly of moderately deep or deep, moderately well drained or well drained soils that have moderately fine texture to moderately coarse texture. These soils have a moderate rate of water transmission.

Group C. Soils having a slow infiltration rate when thoroughly wet. These consist chiefly of soils having a layer that impedes the downward movement of water or soils of moderately fine texture or fine texture. These soils have a slow rate of water transmission.

Group D. Soils having a very slow infiltration rate (high runoff potential) when thoroughly wet. These consist chiefly of clays that have a high shrink-swell potential, soils that have a high water table, soils that have a claypan or clay layer at or near the surface, and soils that are shallow over nearly impervious material. These soils have a very slow rate of water transmission.

Depth to the upper and lower boundaries of each layer is indicated.

Texture is given in the standard terms used by the U.S. Department of Agriculture. These terms are defined according to percentages of sand, silt, and clay in the fraction of the soil that is less than 2 millimeters in diameter. "Loam," for example, is soil that is 7 to 27 percent clay, 28 to 50 percent silt, and less than 52 percent sand. If the content of particles coarser than sand is 15 percent or more, an appropriate modifier is added, for example, "gravelly."

Classification of the soils is determined according to the Unified soil classification system (ASTM, 2005) and the system adopted by the American Association of State Highway and Transportation Officials (AASHTO, 2004).

The Unified system classifies soils according to properties that affect their use as construction material. Soils are classified according to particle-size distribution of the fraction less than 3 inches in diameter and according to plasticity index, liquid limit, and organic matter content. Sandy and gravelly soils are identified as GW, GP, GM, GC, SW, SP, SM, and SC; silty and clayey soils as ML, CL, OL, MH, CH, and OH; and highly organic soils as PT. Soils exhibiting engineering properties of two groups can have a dual classification, for example, CL-ML.

The AASHTO system classifies soils according to those properties that affect roadway construction and maintenance. In this system, the fraction of a mineral soil that is less than 3 inches in diameter is classified in one of seven groups from A-1 through A-7 on the basis of particle-size distribution, liquid limit, and plasticity index. Soils in group A-1 are coarse grained and low in content of fines (silt and clay). At the other extreme, soils in group A-7 are fine grained. Highly organic soils are classified in group A-8 on the basis of visual inspection.

If laboratory data are available, the A-1, A-2, and A-7 groups are further classified as A-1-a, A-1-b, A-2-4, A-2-5, A-2-6, A-2-7, A-7-5, or A-7-6. As an additional refinement, the suitability of a soil as subgrade material can be indicated by a group index number. Group index numbers range from 0 for the best subgrade material to 20 or higher for the poorest.

Rock fragments larger than 10 inches in diameter and 3 to 10 inches in diameter are indicated as a percentage of the total soil on a dry-weight basis. The percentages are estimates determined mainly by converting volume percentage in the field to weight percentage.

Percentage (of soil particles) passing designated sieves is the percentage of the soil fraction less than 3 inches in diameter based on an ovendry weight. The sieves, numbers 4, 10, 40, and 200 (USA Standard Series), have openings of 4.76, 2.00, 0.420, and 0.074 millimeters, respectively. Estimates are based on laboratory tests of soils sampled in the survey area and in nearby areas and on estimates made in the field.

Liquid limit and *plasticity index* (Atterberg limits) indicate the plasticity characteristics of a soil. The estimates are based on test data from the survey area or from nearby areas and on field examination.

References:

American Association of State Highway and Transportation Officials (AASHTO). 2004. Standard specifications for transportation materials and methods of sampling and testing. 24th edition.

American Society for Testing and Materials (ASTM). 2005. Standard classification of soils for engineering purposes. ASTM Standard D2487-00.

Report—Engineering Properties

Absence of an entry indicates that the data were not estimated. The asterisk '*' denotes the representative texture; other possible textures follow the dash. The criteria for determining the hydrologic soil group for individual soil components is found in the National Engineering Handbook, Chapter 7 issued May 2007(http://directives.sc.egov.usda.gov/OpenNonWebContent.aspx?content=17757.wba).

Engineering Properties–Polk County, Florida														
Map unit symbol and soil name	Pct. of map unit	Hydrologic group	Depth	USDA texture	Classification		Fragments		Percentage passing sieve number—				Liquid limit	Plasticity index
					Unified	AASHTO	>10 inches	3-10 inches	4	10	40	200		
			In				*Pct*	*Pct*					*Pct*	
62—Wabasso fine sand														
Wabasso, non-hydric	70	C/D	0-7	Fine sand	SP, SP-SM	A-3	0- 0- 0	0- 0- 0	100-100 -100	100-100 -100	95-98-100	2- 6- 10	0-7 -14	NP
			7-22	Fine sand	SP, SP-SM	A-3	0- 0- 0	0- 0- 0	100-100 -100	100-100 -100	95-98-100	2- 6- 10	0-7 -14	NP
			22-30	Fine sand, loamy sand	SM, SP-SM	A-2-4, A-3	0- 0- 0	0- 0- 0	100-100 -100	100-100 -100	95-98-100	5-13- 20	0-7 -14	NP
			30-35	Fine sand	SP, SP-SM	A-3	0- 0- 0	0- 0- 0	100-100 -100	100-100 -100	95-98-100	2- 6- 10	0-7 -14	NP
			35-80	Fine sandy loam, sandy clay loam	SC, SC-SM	A-2-4, A-2-6	0- 0- 0	0- 0- 0	100-100 -100	100-100 -100	95-98-100	20-28- 35	20-25 -30	5-9 -13
Wabasso, hydric	10	C/D	0-7	Fine sand	SP, SP-SM	A-3	0- 0- 0	0- 0- 0	100-100 -100	100-100 -100	95-98-100	2- 6- 10	0-7 -14	NP
			7-22	Fine sand	SP, SP-SM	A-3	0- 0- 0	0- 0- 0	100-100 -100	100-100 -100	95-98-100	2- 6- 10	0-7 -14	NP
			22-30	Fine sand, loamy sand	SM, SP-SM	A-2-4, A-3	0- 0- 0	0- 0- 0	100-100 -100	100-100 -100	95-98-100	5-13- 20	0-7 -14	NP
			30-35	Fine sand	SP, SP-SM	A-3	0- 0- 0	0- 0- 0	100-100 -100	100-100 -100	95-98-100	2- 6- 10	0-7 -14	NP
			35-80	Fine sandy loam, sandy clay loam	SC, SC-SM	A-2-4, A-2-6	0- 0- 0	0- 0- 0	100-100 -100	100-100 -100	95-98-100	20-28- 35	20-25 -30	5-9 -13
Eaugallie, non-hydric	4	A/D	0-6	Fine sand	SP, SP-SM	A-3	0- 0- 0	0- 0- 0	100-100 -100	100-100 -100	80-89-98	2- 4- 5	0-7 -14	NP
			6-26	Fine sand, sand	SP, SP-SM	A-3	0- 0- 0	0- 0- 0	100-100 -100	100-100 -100	80-89-98	2- 4- 5	0-7 -14	NP
			26-32	Sand, fine sand, loamy fine sand	SM, SP-SM	A-2-4, A-3	0- 0- 0	0- 0- 0	100-100 -100	100-100 -100	80-89-98	5-13- 20	0-7 -14	NP
			32-52	Sand, fine sand	SP, SP-SM	A-2-4, A-3	0- 0- 0	0- 0- 0	100-100 -100	100-100 -100	80-89-98	2- 7- 12	0-7 -14	NP

Engineering Properties–Polk County, Florida														
Map unit symbol and soil name	Pct. of map unit	Hydrologic group	Depth	USDA texture	Classification		Fragments		Percentage passing sieve number—				Liquid limit	Plasticity index
					Unified	AASHTO	>10 inches	3-10 inches	4	10	40	200		
			In				*Pct*	*Pct*					*Pct*	
			52-80	Sandy loam, fine sandy loam, sandy clay loam	SC, SC-SM, SM	A-2-4, A-2-6	0- 0- 0	0- 0- 0	100-100 -100	100-100 -100	80-89-98	20-28-35	0-20 -40	NP-10-20
Felda	4	A/D	0-5	Fine sand	SP, SP-SM	A-3	0- 0- 0	0- 0- 0	100-100 -100	100-100 -100	90-95-99	2- 4- 5	0-7 -14	NP
			5-22	Fine sand, sand	SP, SP-SM	A-3	0- 0- 0	0- 0- 0	100-100 -100	100-100 -100	90-95-99	2- 4- 5	0-7 -14	NP
			22-50	Sandy loam, fine sandy loam, sandy clay loam	SC, SC-SM, SM	A-2-4, A-2-6	0- 0- 0	0- 0- 0	100-100 -100	100-100 -100	90-95-99	15-25-35	0-20 -40	NP-8 -15
			50-80	Sandy loam, fine sand, loamy sand	SP, SP-SM	A-2-4, A-3	0- 0- 0	0- 0- 0	100-100 -100	100-100 -100	80-90-99	2- 7- 12	0-7 -14	NP
Floridana, depressional	3	C/D	0-8	Mucky fine sand	SM, SP-SM	A-2-4, A-3	0- 0- 0	0- 0- 0	100-100 -100	100-100 -100	80-85-90	5-11- 25	0-7 -14	NP
			8-15	Fine sand	SM, SP-SM	A-2-4, A-3	0- 0- 0	0- 0- 0	100-100 -100	100-100 -100	80-85-90	5-11- 25	0-7 -14	NP
			15-28	Sand, fine sand	SP, SP-SM	A-3	0- 0- 0	0- 0- 0	100-100 -100	100-100 -100	80-85-90	2- 6- 10	0-7 -14	NP
			28-80	Sandy loam, fine sandy loam, sandy clay loam	SC, SC-SM	A-2-4, A-2-6	0- 0- 0	0- 0- 0	100-100 -100	100-100 -100	85-90-95	20-28-35	20-30 -40	7-13-18
Holopaw, depressional	3	A/D	0-6	Fine sand	SP, SP-SM	A-3	0- 0- 0	0- 0- 0	100-100 -100	95-98-100	70-83-95	2- 6- 10	0-7 -14	NP
			6-41	Fine sand, sand	SP, SP-SM	A-3	0- 0- 0	0- 0- 0	100-100 -100	95-98-100	70-83-95	2- 6- 10	0-7 -14	NP
			41-65	Sandy loam, fine sandy loam, sandy clay loam	SC-SM, SM	A-2-4	0- 0- 0	0- 0- 0	100-100 -100	95-98-100	70-83-95	15-23-30	0-13 -25	NP-4 -7
			65-80	Loamy sand, loamy fine sand, fine sand	SM, SP-SM	A-2-4	0- 0- 0	0- 0- 0	100-100 -100	95-98-100	70-83-95	11-16-20	0-7 -14	NP

Engineering Properties–Polk County, Florida														
Map unit symbol and soil name	Pct. of map unit	Hydrologic group	Depth	USDA texture	Classification		Fragments		Percentage passing sieve number—				Liquid limit	Plasticity index
					Unified	AASHTO	>10 inches	3-10 inches	4	10	40	200		
			In				*Pct*	*Pct*					*Pct*	
Malabar	3	A/D	0-5	Fine sand	SP, SP-SM	A-3	0- 0- 0	0- 0- 0	100-100-100	100-100-100	80-90-100	2- 6- 10	0-7 -14	NP
			5-22	Fine sand, sand	SP, SP-SM	A-3	0- 0- 0	0- 0- 0	100-100-100	100-100-100	80-90-100	2- 6- 10	0-7 -14	NP
			22-38	Sand, fine sand	SP, SP-SM	A-2-4, A-3	0- 0- 0	0- 0- 0	100-100-100	100-100-100	80-90-100	3- 8- 12	0-7 -14	NP
			38-48	Sand, fine sand	SP, SP-SM	A-3	0- 0- 0	0- 0- 0	100-100-100	100-100-100	80-90-100	2- 6- 10	0-7 -14	NP
			48-80	Sandy clay loam, fine sandy loam, sandy loam	SC, SC-SM, SM	A-2, A-4, A-6	0- 0- 0	0- 0- 0	100-100-100	100-100-100	80-90-100	20-30-40	0-18 -35	NP-10-20
Pomona, non-hydric	3	A/D	0-6	Fine sand	SP, SP-SM	A-2-4, A-3	0- 0- 0	0- 0- 0	100-100-100	100-100-100	85-93-100	2- 7- 12	0-7 -14	NP
			6-21	Sand, fine sand	SP, SP-SM	A-2-4, A-3	0- 0- 0	0- 0- 0	100-100-100	100-100-100	85-93-100	2- 7- 12	0-7 -14	NP
			21-26	Fine sand, sand, loamy fine sand	SM, SP-SM	A-2-4, A-3	0- 0- 0	0- 0- 0	100-100-100	100-100-100	85-93-100	5-12- 15	0-7 -14	NP
			26-48	Sand, fine sand	SP, SP-SM	A-2-4, A-3	0- 0- 0	0- 0- 0	100-100-100	100-100-100	85-93-100	2- 7- 12	0-7 -14	NP
			48-73	Sandy clay loam, fine sandy loam, sandy clay	SM, SC-SM, SC	A-2, A-4, A-6	0- 0- 0	0- 0- 0	100-100-100	95-98-100	85-93-100	25-38-50	0-20 -40	NP-8 -16
			73-80	Sandy loam, fine sand, loamy sand	SM, SP-SM	A-2-4, A-3	0- 0- 0	0- 0- 0	100-100-100	95-98-100	85-93-100	5-12- 15	0-7 -14	NP

Data Source Information

Soil Survey Area: Polk County, Florida
Survey Area Data: Version 12, Nov 19, 2015